**IN THE CLAIMS:**

Claims 1-42 Canceled

**Please add the following new claims:**

--43. (New) A method of cortical mapping of a patient, comprising:

positioning a first electromyographic (EMG) sensor at a first predetermined muscle location of the patient;

installing a grid, having a plurality of electrodes, onto the cortex of the patient, an electrode pair being defined as any two immediately adjacent ones of the plurality of electrodes;

sequentially stimulating individual pairs of the electrodes until a first muscle contraction event is detected by the first EMG sensor; and

assigning a one-to-one-correspondence between the detected muscle contraction event and a particular first one of the pairs of electrodes.

44. (New) The method of claim 43, further comprising marking a portion of the cortex proximate the particular one pair of electrodes.

45. (New) The method of claim 44, further comprising resectioning an unwanted portion of the cortex while protecting the marked portion of the cortex.

46. (New) The method of claim 43, further comprising:

selecting and positioning a second EMG sensor at a second predetermined muscle location of the patient;

performing the sequential stimulating until respective first and second muscle contraction events are detected by the first and second EMG sensors; and

assigning a one-to-one-correspondence between the second detected muscle contraction event and a particular second of the pairs of electrodes.

47. (New) The method of claim 46, further comprising providing a physical mapping of the cortex for respective discrete cortical locations of portions of the cortex proximate the first and second pairs of electrodes, the discrete mapped physical cortical locations thereby corresponding to individual muscle functions of the patient.

48. (New) The method of claim 47, further comprising presenting the physical mapping of the cortex, the presenting being adapted for intraoperative localization of functional areas of the cortex.

49. (New) The method of claim 48, wherein the presenting includes displaying patient profile data that includes at least one of patient safety concerns, procedural information, locations of monitored muscles, anesthetization information, and physiological information.

50. (New) The method of claim 43, wherein if a detected muscle contraction event is associated with one or more of the pairs of electrodes during the stimulating, the one or more associated electrode pair(s) is/are eliminated from a subsequent pairing pattern of a mapping session.

51. (New) The method of claim 43, wherein the at least one algorithm calculates a stimulus voltage to be applied by an individual pair of the plurality of electrodes based on a best guess of a threshold response voltage for the type of muscle expected to be stimulated by the individual electrode pair, the electrodes being subdural electrodes.

52. (New) A computer program product for enabling a computer to physically map the cortex of a patient, comprising:

software instructions for enabling the computer to perform predetermined operations, and a computer readable medium bearing the software instructions, the predetermined operations including the steps of:

inputting a first electromyographic (EMG) sensor disposed at a first predetermined muscle location of the patient;

accessing a grid, having a plurality of electrodes, on the cortex of the patient, any two adjacent ones of the plurality of electrodes being a pair;

sequentially stimulating individual pairs of the electrodes until a first muscle contraction event is detected by the first EMG sensor; and

assigning a one-to-one-correspondence between the detected first muscle contraction event and a particular first one of the pairs of electrodes.

53. (New) The computer program product of claim 52, wherein the predetermined operations further include locking out the stimulating step for a period where the patient's brain recovers from prior stimulation.

54. (New) The computer program product of claim 52, wherein the predetermined operations further include determining whether a current mapping session has identified a correspondence between all monitored muscles and respective individual pairs of the electrodes with a predetermined degree of confidence and, if so, terminating the mapping session.

55. (New) A system for physically mapping the cortex of a patient, comprising:

a plurality of subdural electrodes formed as a plurality of individual electrode pairs, each individual electrode pair consisting of two immediately adjacent electrodes of the plurality of subdural electrodes;

a plurality of electromyographic (EMG) sensors disposed at a corresponding plurality of predetermined muscle locations of a patient for detecting muscle contraction events;

a memory having at least one region for storing computer executable program code; and

a processor for executing the program code stored in the memory,

wherein the program code includes:

code configured for sequentially stimulating the individual pairs of electrodes;

code responsive to monitor the plurality of EMG sensors until a first predetermined muscle contraction event is detected;

code responsive to the occurrence of event detection, to match the first predetermined muscle contraction event detection with the stimulation of a first one of the individual electrode pairs; and

code responsive to the matching, to identify a particular muscle function with a physical location of the first one individual electrode pair.

56. (New) The system of claim 55, wherein the program code further includes code responsive to at least one algorithm for establishing a confidence of the event detection.

57. (New) The system of claim 55, wherein:

the program code responsive to the occurrence of event detection is operative to match a second predetermined muscle contraction event detection with the stimulation of a second one of the individual electrode pairs; and

wherein the code responsive to the matching is operative to identify a particular muscle function with a physical location of the second one individual electrode pair;

the program code further including code responsive to the identifying, to obtain a multi-functional map of the cortex.

58. (New) The system of claim 57, further comprising program code adapted for comparing the map with a predetermined map and determining at least one dimensional offset therefrom for determining a shifted position of the plurality of electrodes, wherein the plurality of electrodes are formed as a grid.

59. (New) The system of claim 57, further comprising means for guiding a resectioning of the cortex based on the map.

60. (New) The system of claim 57, wherein the program code for obtaining the map includes reading a data set, the data set defining a series of electromyograph detection scans, the system further comprising program code configured for displaying a relationship between the data set and a scaled graphical image of the cortex.

61. (New) The system of claim 55, wherein the program code includes at least one algorithm operative to calculate a stimulus voltage to be applied to an individual one of the plurality of electrode pairs based on a best guess of a threshold response voltage for a type of muscle contraction event expected to correspond to the individual electrode pair.

62. (New) A cortical mapping system, comprising:

a plurality of subdural electrodes formed as a grid having a plurality of electrode pairs, each electrode pair being defined by a pairing pattern that includes, for individual ones of the plurality of subdural electrodes, pairing the individual electrode with an immediately adjacent electrode of the grid;

a cortical stimulator for stimulating a first individual pair and then a second individual pair of the plurality of electrode pairs;

a plurality of electromyographic (EMG) sensors disposed at a corresponding plurality of predetermined muscle locations of a patient for detecting reaction to the stimulating; and

a controller configured for associating the reaction with one of the first and second individual pairs of the plurality of subdural electrodes.

63. (New) The system of claim 62, wherein the controller is configured for presenting a physical location map of a cortex that matches at least one of the individual pairs of subdural electrodes respectively to at least one of the plurality of sensors.

64. (New) The system of claim 62, wherein the cortical stimulator is configured for conducting the stimulating in a stimulation pattern that includes a sequence of individual passes, each pass including a sequence of applying stimuli to those individual pairs identified in a pairing pattern, the sequence of applying stimuli being in accordance with a stimulation minimization algorithm based on prior verification of mapping data for at least one pair of the plurality of subdural electrodes, the algorithm eliminating verified electrode pairs from the pairing pattern.

65. (New) Apparatus comprising:

means for intraoperatively localizing functional areas of the brain comprising:

means for stimulating a portion of a cortex;

means for detecting a muscle contraction event in response to the stimulating; and

means for associating the detecting with the stimulating, thereby producing a map identifying at least one specific functional location of the cortex; and

means for notifying a user of the mapped functional identification in relation to discrete cortical locations being stimulated.

66. (New) A method, comprising:

identifying individual electrode pairs of a grid of subdural electrodes as selectable stimulus points in a closed loop system of cortical mapping based on electromyographic detection events; and

detecting electromyographic events in response to a stimulation applied to the individual pairs of the subdural electrodes and utilizing the detected eletromyographic events to map the cortex based on identification of the individual pairs as individual physical stimulation locations.

67. (New) The method of claim 66, wherein the detected electromyographic events include a detected contraction of a particular muscle of a patient, the method further comprising graphically presenting correlation between the detected muscle contraction and a particular individual electrode pair.

68. (New) The method of claim 66, further comprising utilizing a clock for matching a stimulation signal at one of the individual electrode pairs with a single electromyographic detection event.--